CLAIMS

What is claimed is:

1. A wavelength locker for determining the wavelength of light emitted by a laser diode, the wavelength locker comprising:

a surface that receives light from a back facet of a laser diode and redirects at least a portion of the light;

a collimating lens that receives the at least a first portion of the light from the surface;

a filter layer that comprises a first filter, wherein the filter layer receives collimated light from the lens; -*

a first photosensitive area that receives filtered light through the first filter and detects a first signal; and

a second photosensitive area that receives light that does not pass through the first filter and detects a second signal;

wherein the detection response of the first photosensitive area and the detection response of the second photosensitive area are used to determine the wavelength and power of the light emitted by the laser diode.

2. A wavelength locker as in claim 1, wherein the lens comprises a first collimating element and a second collimating element, the first photosensitive area receiving collimated light from the first collimating element and the second photosensitive area receiving collimated light from the second collimating element.

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3. A wavelength locker as in claim 1, wherein the lens comprises a single collimating element and the first photosensitive area and the second photosensitive area are arranged concentrically such that the second photosensitive area at least partially surrounds the first photosensitive area.

4. A wavelength locker as in claim 1, wherein the filter layer further comprises a second filter, wherein the second filter has a transmission response that is different from a transmission response of the first filter and wherein the second photosensitive area receives light through the second filter.

5. A wavelength locker as in claim 1, wherein the second photosensitive area receives light through an optically passive spacer that is adjacent the first filter.

6. A wavelength locker as in claim 1, wherein the reflective surface comprises a prism.

7. A wavelength locker as in claim 1, wherein the reflective surface comprises one or more dielectric filters.

8. A wavelength locker as in claim 1, wherein the reflective surface comprises a dielectric filter on a beamsplitter that reflects a first portion of the light and transmits a second portion of the light, wherein the first portion of light is directed towards the first photosensitive area and the second portion of light is directed towards the second photosensitive area.

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9. A wavelength locker as in claim 8, wherein the dielectric filter is on an angled front facet of the beamsplitter.

10. A wavelength locker as in claim 8, wherein the dielectric filter is on an angled back facet of the beamsplitter.

11. A wavelength locker as in claim 1, wherein the wavelength of the light emitted by the laser diode is determined from a differential between the detection response of the first photosensitive area and the detection response of the second photosensitive area.

12. A wavelength locker as in claim 1, wherein the power of the light emitted by the laser diode is determined from a sum of the detection response of the first photosensitive area and the detection response of the second photosensitive area.

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13. A wavelength locker mounted on a submount with a laser diode, the wavelength locker comprising:

a power monitor photodiode that receives light from a back facet of a laser diode, wherein the power monitor diode determines the power of the light;

a reflective surface of the power monitor photodiode that receives and redirects the light;

a lens that receives the light from the reflective surface, wherein the lens collimates the light;

a filter layer that receives the collimated light from the lens and filters the light; and

a detector comprising a photosensitive area, wherein the photosensitive area receives and detects light passed through the filter layer, wherein the wavelength of the light is determined from the detection response of the photosensitive area, taking into account the power of the laser.

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14. A wavelength locker for determining the wavelength of light emitted by a laser diode, the wavelength locker comprising:

a first photosensitive area;

a second photosensitive area;

means for receiving light from a laser diode and directing a first portion of the light onto the first photosensitive area and directing a second portion of the light onto the second photosensitive area; and

an optical filter that modifies the portion of the light that is directed to the first photosensitive area;

wherein the detection response of the first photosensitive area and the detection response of the second photosensitive area are used to determine the wavelength and power of the light emitted by the laser diode.

15. A wavelength locker as in claim 14, wherein the means for receiving light from a back facet of a laser diode and directing a first portion of the light onto the first photosensitive area and a second portion of the light onto the second photosensitive area comprises one or more of: a prism, a mirror, a reflective surface, a dielectric filter, a beamsplitter, a lens, a diffractive element, a holographic element, an etalon, and combinations thereof.

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16. An optical transceiver, comprising:

a laser diode that emits light from front and back facets thereof;

a controller module that modifies the wavelength of the light based upon a determined wavelength of the light; and

a wavelength locker that determines the wavelength of the light, comprising:

a reflective surface that receives light from the back facet of the laser diode;

a first lens that receives the light reflected by the reflective surface, wherein the first lens collimates the light;

a filter layer that includes a first filter, wherein the first filter receives the collimated light from the first lens; and

a detector including a first photosensitive area and a second photosensitive area, wherein the first photosensitive area receives light through the first filter to detect a first signal and the second photosensitive area receives light that does not pass through the first filter to detect a second signal, wherein the wavelength of the light is determined from differential between the first signal and the second signal.

17. An optical transceiver as in claim 16, wherein the reflective surface comprises a prism.

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18. An optical transceiver as in claim 17, further comprising:

a second lens that receives a second portion of the light reflected by the prism, wherein the second lens collimates the second portion of the light;

wherein the second photosensitive area receives the second portion of the light through the second lens.

19. An optical transceiver as in claim 16, wherein the laser diode is mounted upon a laser diode submount, the optical transceiver further comprising a thermoelectric cooler upon which the wavelength locker and the laser diode submount are mounted.

20. An optical transceiver as in claim 19, further comprising a controller in communication with each of the detector and the thermoelectric cooler, wherein the controller controls the temperature of the thermoelectric cooler based upon the wavelength of the light as detected by the detector.

21. An optical transceiver as in claim 16, further comprising:

a first mirror that receives light from the front facet of a laser diode, wherein the first mirror reflects the light;

a lens that receives the reflected light from the first mirror and collimates or focuses the light; and

a second mirror that that receives the light from the lens and reflects the light in a desired direction towards other optical components.

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22. A method for determining the wavelength of light emitted by a laser diode, the method comprising:

receiving light from the back facet of a laser diode;

separating the light into a first portion and a second portion;

passing the first portion of light through a first filter and onto a photosensitive surface;

passing the second portion of light onto a second photosensitive surface; and

determining the wavelength of the light emitted by the laser diode from a differential between the detection response of the first photosensitive surface and the detection response of the second photosensitive surface.

23. A method as in claim 22, further comprising, prior to passing the second portion of light onto a second photosensitive surface, passing the second portion of light through a second filter.

24. A method as in claim 22, further comprising, using the output of the first photosensitive surface and the second photosensitive surface, determining the power of the light emitted by the laser diode.

25. A method as in claim 22, further comprising, prior to passing the first portion of light through a first filter, passing the first portion of light through a collimating lens.

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